COMMON HALF-YEARLY EXAMINATION - 2019

Reg No. XI 2 2 1 2

Standard XII

PHYSICS

Time: 3.00 hours.

Marks. 70

Instructions : i) Check the question paper for fairness of printing. If there is any lack of fairness, inform the Hall Supervisor immediately.

ii) Use blue or black ink to write and underline and pencil to draw diagrams.

Part - I

15 x 1 = 15

Note : i) Answer all questions.

ii) Choose the correct answer from the four alternatives and write the option code and the corresponding answer.

1. If the velocity and wavelength of light in air is V_a and λ_a and that in water is V_w and λ_w then the refractive index of water is

   a) $\dfrac{V_w}{V_a}$
   b) $\dfrac{V_a}{V_w}$
   c) $\dfrac{\lambda_w}{\lambda_a}$
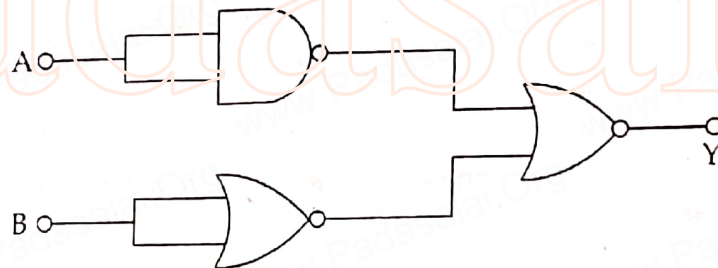   d) $\dfrac{V_a \lambda_a}{V_w \lambda_w}$

2. The flux linked with a coil at any instant t is given by $\phi_B = 10t^2 - 50t + 250$. The induced emf at t = 3 s is

   a) −190 V
   b) −10 V
   c) 10 V
   d) 190 V

3. If V_g, V_x, V_m are speeds of Gamma rays, X-rays and microwaves respectively in vacuum then

   a) $V_g < V_x < V_m$
   b) $V_g > V_x > V_m$
   c) $V_m > V_g > V_x$
   d) $V_g = V_x = V_m$

4. The given electrical network is equivalent to

   a) AND gate
   b) OR gate
   c) NOR gate
   d) NOT gate

5. Which charge configuration produces a uniform electric field?

   a) point charge
   b) infinite uniform line charge
   c) uniformly charged infinite plane
   d) uniformly charged spherical shell

6. In an electron microscope, the electrons are accelerated by a voltage of 25 kV. If the voltage is changed to 225 kV, then the de-Broglie wavelength associated with the electrons would

   a) increase by 3 times
   b) decrease by 3 times
   c) decrease by 4 times
   d) increase by 4 times

7. In a transformer, the number of turns in the primary and the secondary coil are 300 and 1800 respectively. If the current in primary is 6 A, then that in the secondary coil is
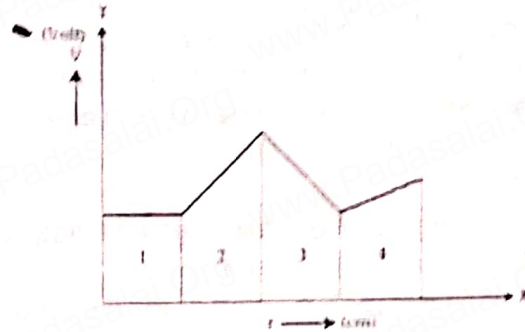
   a) 2 A
   b) 18 A
   c) 12 A
   d) 1 A

8. The magnitude of magnetic moment of an electron orbiting in a circular orbit of radius r with a speed V is equal to

   a) $\dfrac{eVr}{2}$
   b) eVr
   c) $\dfrac{er}{2V}$
   d) $\dfrac{2V}{er}$

(2)

9. In the graph, potential (V) is plotted as a function of distance (x) from the center. In which part of the region the magnitude of X-component of electric field becomes zero?

a) 1   b) 2   c) 3   d) 4

10. A ray of light gets refracted into the air medium from crown glass of refractive index 1.541. If angle of incidence is equal to the critical angle 40.5°, then the angle of refraction will be
   a) equal to the critical angle   b) lesser than the critical angle
   c) equal to 90°   d) greater than critical angle

11. An electric bulb is rated 100 W, 230 V. The supply voltage drops to 115 V. What is the heat energy produced by the bulb in 20 min?
   a) 30 kJ   b) 40 kJ   c) 35 kJ   d) 45 kJ

12. The vertical component of Earth's magnetic field at a place is equal to the horizontal component. What is the value of angle of dip at this place?
   a) 30°   b) 45°   c) 60°   d) 90°

13. The radius of $^{27}_{13}Al$ nucleus is
   a) 6.97 F   b) 3.6 F   c) 2.4 F   d) 4.2 F

14. Calculate the height of the antenna required to transmit the modulated signal of frequency v = 3 MHz is
   a) 25 m   b) 75 m   c) 7.5 km   d) 2.5 km

15. The primary use of a zener diode is
   a) rectifier   b) amplifier
   c) oscillator   d) voltage regulator

Part - II

Answer any 6 questions: (Ques.No.24 is compulsory)   6 x 2 = 12

16. Define impact parameter.
17. What are the differences between Coulomb force and Grativational force?
18. Two polaroids are kept with their transmission axes inclined at 30°. Unpolarised light of intensity I falls on the first polaroid. Find out the intensity of light emerging from the second period.
19. What is meant by hysteresis?
20. In a transistor connected in the common base configuration, α = 0.95, I_E = 1 mA. Calculate the values of I_C and I_B.
21. Distinguish between drift velocity and mobility.
22. What is Bandwidth in Communication?